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10/743,247	12/22/2003	Chung Foong Tan	CS03-046	6960

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EXAMINER	
PERKINS, PAMELA E	
ART UNIT	**PAPER NUMBER**
2822	

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H·A

Office Action Summary	Application No.	Applicant(s)	
	10/743,247	TAN ET AL.	
	Examiner	Art Unit	
	Pamela E. Perkins	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/22/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the filing of the application papers on 22 December 2003. Claims 1-20 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 5, 12 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "preferably" in claims 5, 12 and 20 renders the claim indefinite, as one of ordinary skill in the art would not be reasonably apprised of the intended scope of the claim, whether the claimed degree angle and a quad twist are limitations of claims 5, 12 and 20.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1,2, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saha (6,344,405) in view of Lee (5,937,293).

Saha discloses a method for forming an amorphous shallow implant region including providing a gate structure (102), on a substrate (100) comprised with a first

conductivity type dopant (Fig. 2; col. 3, lines 53-64); the substrate (10) comprised of an upper crystalline section; performing a shallow amorphizing implant to form an amorphous shallow implant region (108); the amorphous shallow implant region (108) being formed at a first depth (Fig. 3A; col. 4, lines 15-31); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (112) adjacent to the gate structure (102); the amorphous pocket region is formed at a second depth below shallow implant region (108) (Fig. 5; col. 5, lines 40-64); performing a SDE implant to form SDE regions (114) of a second conductivity type using the gate structure (102) as a mask (Fig. 6; col. 6, lines 10-32); performing a source/drain implant procedure to form deep source/drain regions (118) (Fig. 8; col. 7, lines 1-15); performing an anneal procedure to recrystalize the amorphous shallow implant region (108) and the amorphous pocket region (112), therefore, the amorphous shallow implant region reduces defects formed by the pocket amorphizing implant (col. 7, lines 23-33).

Saha does not disclose forming the amorphous pocket region prior to forming the amorphous shallow implant region.

Lee discloses a method for forming an amorphous shallow implant region including providing a gate structure (23), on a substrate (21) (Fig. 4a; col. 3, lines 33-51); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (26) adjacent to the gate structure (23); the amorphous pocket region (26) is formed at a first depth below the substrate surface (21) (Fig. 4c; col. 4, lines 15-20); performing a shallow amorphizing

implant to form an amorphous shallow implant region (29); the amorphous shallow implant region (29) being formed at a second depth above the amorphous pocket region (26) (Fig. 4f; col. 4, lines 31-34).

Since Saha and Lee are both from the same field of endeavor, a method for forming an amorphous shallow implant region, the purpose disclosed by Lee would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by forming the amorphous pocket region prior to forming the amorphous shallow implant region as taught by Lee to prevent punch through (col. 4, lines 35-39).

Referring to claims 2 and 9, Saha discloses a rapid thermal anneal process comprising a soak and spike step, wherein the soak step at a temperature of 900 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature of 1100 ^{o}C and a ramp down from the peak temperature; the ramp up and ramp down have a rate between 200 and 300 degree ^{o}C per minute (col. 7, lines 23-33).

Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saha in view of Lee as applied to claims 1 and 8 above, and further in view of Krishnan et al. (6,399,452).

Saha in view of Lee disclose the subject matter claimed above except the soak temperature between 600 and 800 ^{o}C and the ramp down temperature below 800 ^{o}C.

Krishnan et al. disclose a method for forming a pocket implantation regions including providing a gate structure (303B), on a substrate (301) (Fig. 4A); performing a

pocket amorphizing implantation procedure to implant ions to form a pocket implant region (401) adjacent to the gate structure (303B); the amorphous pocket region (401) is formed at a first depth below the substrate surface (301) (Fig. 4A); performing a SDE implant to form SDE regions (309) of a second conductivity type using the gate structure (303B) as a mask; performing a source/drain implant procedure to form deep source/drain regions (310) (Fig. 4B; col. 3, lines 55-67); and annealing the regions (col. 3, lines 36-39).

Referring to claims 7 and 16, Krishnan et al. disclose a rapid thermal anneal process comprising a soak and spike step, wherein the soak step at a temperature of 700 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature between 1000 and 1100 ^{o}C and a ramp down from the peak temperature to a temperature below 800 ^{o}C; the ramp up and ramp down have a rate between 200 and 300 degree ^{o}C per minute (col. 1, lines 28-34).

Since Saha and Krishnan et al. are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Krishnan et al. would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by a rapid thermal anneal process comprising a soak and spike step, wherein the soak step at a temperature of 700 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature between 1000 and 1100 ^{o}C and a ramp down from the peak temperature to a

temperature below 800 ^{o}C as taught by Krishnan et al. to prevent transient enhanced diffusion (col. 1,lines 51-55).

Claims 3, 6, 10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saha in view of Lee as applied to claims 1 and 8 above, and further in view of Yu (6,630,385) ("Yu '385").

Saha in view of Lee disclose the subject matter claimed above including the substrate above the amorphous pocket region and shallow implant region remaining crystalline (Saha: Fig. 5; col. 4, lines 19-31). However, Saha in view of Lee do not disclose the amorphous pocket region is formed at a depth between 40 and 100 nm and having a thickness between 10 and 20 nm; and the amorphous shallow implant region is formed at a minimum depth of about 8 nm and a maximum depth of 20 nm below the substrate surface and having a thickness between 5 and 10 nm.

Yu '385 discloses a method for forming an amorphous shallow implant region including providing a gate structure (3), on a substrate (1); performing a source/drain implant procedure to form deep source/drain regions (5) (Fig. 1; col. 2, lines 51-57); performing a pocket amorphizing implantation procedure to implant ions to form a pocket implant region (11) adjacent to the gate structure (3); the amorphous pocket region (11) is formed at a first depth below the substrate surface (1) (Fig. 2; col. 2, lines 58-63); performing a shallow amorphizing implant to form an amorphous shallow implant region (14); the amorphous shallow implant region (14) being formed at a second depth above the amorphous pocket region (11); performing a SDE implant to form SDE regions (15) using the gate structure (3) as a mask (Fig. 4; col. 3,lines 2-9);

performing an anneal procedure to recrystalize the amorphous shallow implant region (14) and the amorphous pocket region (11) (col. 3, lines 9-15).

Referring to claims 3 and 10, Yu '385 discloses the amorphous pocket region is formed at a depth between 40 and 100 nm (col. 2,lines 58-63).

Referring to claims 6 and 13, Yu '385 discloses the amorphous shallow implant region is formed at a minimum depth of about 10 nm and a maximum depth of 30 nm below the substrate surface (col. 3, lines 2-7).

Since Saha and Yu '385 are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Yu '385 would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by forming the amorphous pocket region at a depth between 40 and 100 nm and forming the amorphous shallow implant region at a minimum depth of about 10 nm and a maximum depth of 30 nm as taught by Yu '385 to improve threshold voltage (col. 1, lines 50-56).

Saha discloses the claimed invention except for the amorphous pocket region having a thickness between 10 and 20 nm; and the amorphous shallow implant region having a thickness between 5 and 10 nm. It would have been obvious to one having ordinary skill in the art at the time invention was made to have the amorphous pocket region with a thickness between 10 and 20 nm; and the amorphous shallow implant region with a thickness between 5 and 10 nm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or

workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saha in view of Lee further in view of Yu'385 as applied to claims 1 and 8 above, and further in view of Yu (6,465,325) ("Yu '325").

Saha in view of Lee further in view of Yu'385 disclose the subject matter claimed above including the pocket amorphizing implantation comprises implanting Sb or In species (Saha: col. 4, lines 36-59) and the amorphous pocket region is formed at a depth between 40 and 100 nm (Yu '385: col. 2,lines 58-63). However, Saha in view of Lee further in view of Yu'385 do not disclose the pocket amorphizing energy between 115 and 150 keV using a quad implant at a 45-degree angle.

Yu '325 discloses a method for forming an amorphous shallow implant region including providing a gate structure (18), on a substrate (14) (Fig. 2; col. 6, lines 4-6); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (70/72) adjacent to the gate structure (18); the amorphous pocket region (70/72) is formed at a first depth below the substrate surface (21) (Fig. 4; col. 6, lines 23-39); performing a SDE implant to form SDE regions (78/80) of a second conductivity type using the gate structure (36) as a mask (Fig. 5; col. 6, lines 40-47); performing a source/drain implant procedure to form deep source/drain regions (22/24) (Fig. 6; col. 6, lines 48-60).

Referring to claims 4 and 11, Yu '325 discloses using a quad implant at 45-degree angle to form the pocket amorphizing implantation (col. 6, lines 23-32).

Since Saha and Yu '325 are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Yu '325 would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by using a quad implant at 45 degree angle to form the pocket amorphizing implantation as taught by Yu '325 to optimize the channel profile (col. 2, lines 38-40).

Referring to claims 4 and 11, Saha discloses the pocket amorphizing implantation claim 1 wherein the pocket amorphizing energy may be between 100 and 1000 eV (col. 5, lines 2-6). It is noted that the specification contains no disclosure of either the critical nature of the claimed concentrations or any unexpected results arising there from. It would have been obvious to one of ordinary skill in the art to form the amorphous pocket region with an energy between 115 and 150 KeV since it has been held that "In such an situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) See MPEP § 2144.05.

Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saha in view of Lee, Yu '385 and Krishnan et al.

Saha discloses a method for forming an amorphous shallow implant region including providing a gate structure (102), on a substrate (100) comprised with a first conductivity type dopant (Fig. 2; col. 3, lines 53-64); the substrate (10) comprised of an upper crystalline section; performing a shallow amorphizing implant to form an

amorphous shallow implant region (108); the amorphous shallow implant region (108) being formed at a first depth (Fig. 3A; col. 4, lines 15-31); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (112) adjacent to the gate structure (102); the amorphous pocket region is formed at a second depth below shallow implant region (108) (Fig. 5; col. 5, lines 40-64); performing a SDE implant to form SDE regions (114) of a second conductivity type using the gate structure (102) as a mask (Fig. 6; col. 6, lines 10-32); performing a source/drain implant procedure to form deep source/drain regions (118) (Fig. 8; col. 7, lines 1-15); performing an anneal procedure to recrystalize the amorphous shallow implant region (108) and the amorphous pocket region (112), therefore, the amorphous shallow implant region reduces defects formed by the pocket amorphizing implant (col. 7, lines 23-33).

Saha does not disclose forming the amorphous pocket region prior to forming the amorphous shallow implant region; anneal process comprising a soak and spike step, wherein the soak step at a temperature between 600 and 800 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature of 1100 ^{o}C and a ramp down from the peak temperature below 800 ^{o}C; the ramp up and ramp down have a rate between 200 and 300 degree ^{o}C per minute; the amorphous pocket region is formed at a depth between 40 and 100 nm; and the amorphous shallow implant region is formed at a minimum depth of about 8 nm and a maximum depth of 20 nm.

Lee discloses a method for forming an amorphous shallow implant region including providing a gate structure (23), on a substrate (21) (Fig. 4a; col. 3, lines 33-51); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (26) adjacent to the gate structure (23); the amorphous pocket region (26) is formed at a first depth below the substrate surface (21) (Fig. 4c; col. 4, lines 15-20); performing a shallow amorphizing implant to form an amorphous shallow implant region (29); the amorphous shallow implant region (29) being formed at a second depth above the amorphous pocket region (26) (Fig. 4f; col. 4, lines 31-34).

Since Saha and Lee are both from the same field of endeavor, a method for forming an amorphous shallow implant region, the purpose disclosed by Lee would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by forming the amorphous pocket region prior to forming the amorphous shallow implant region as taught by Lee to prevent punch through (col. 4, lines 35-39).

Krishnan et al. disclose a method for forming a pocket implantation regions including providing a gate structure (303B), on a substrate (301) (Fig. 4A); performing a pocket amorphizing implantation procedure to implant ions to form a pocket implant region (401) adjacent to the gate structure (303B); the amorphous pocket region (401) is formed at a first depth below the substrate surface (301) (Fig. 4A); performing a SDE implant to form SDE regions (309) of a second conductivity type using the gate structure (303B) as a mask; performing a source/drain implant procedure to form deep

source/drain regions (310) (Fig. 4B; col. 3, lines 55-67); and annealing the regions (col. 3, lines 36-39). Krishnan et al. further disclose a rapid thermal anneal process comprising a soak and spike step, wherein the soak step at a temperature of 700 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature between 1000 and 1100 ^{o}C and a ramp down from the peak temperature to a temperature below 800 ^{o}C; the ramp up and ramp down have a rate between 200 and 300 degree ^{o}C per minute (col. 1, lines 28-34).

Since Saha and Krishnan et al. are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Krishnan et al. would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by a rapid thermal anneal process comprising a soak and spike step, wherein the soak step at a temperature of 700 ^{o}C for a time between 10 and 30 seconds and the spike step where the temperature ramps up to a peak temperature between 1000 and 1100 ^{o}C and a ramp down from the peak temperature to a temperature below 800 ^{o}C as taught by Krishnan et al. to prevent transient enhanced diffusion (col. 1,lines 51-55).

Yu '385 discloses a method for forming an amorphous shallow implant region including providing a gate structure (3), on a substrate (1); performing a source/drain implant procedure to form deep source/drain regions (5) (Fig. 1; col. 2, lines 51-57); performing a pocket amorphizing implantation procedure to implant ions to form a pocket implant region (11) adjacent to the gate structure (3); the amorphous pocket

region (11) is formed at a first depth below the substrate surface (1) (Fig. 2; col. 2, lines 58-63); performing a shallow amorphizing implant to form an amorphous shallow implant region (14); the amorphous shallow implant region (14) being formed at a second depth above the amorphous pocket region (11); performing a SDE implant to form SDE regions (15) using the gate structure (3) as a mask (Fig. 4; col. 3,lines 2-9); performing an anneal procedure to recrystalize the amorphous shallow implant region (14) and the amorphous pocket region (11) (col. 3, lines 9-15). Yu '385 further discloses the amorphous pocket region is formed at a depth between 40 and 100 nm (col. 2,lines 58-63). Yu '385 also discloses the amorphous shallow implant region is formed at a minimum depth of about 10 nm and a maximum depth of 30 nm below the substrate surface (col. 3, lines 2-7).

Since Saha and Yu '385 are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Yu '385 would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by forming the amorphous pocket region at a depth between 40 and 100 nm and forming the amorphous shallow implant region at a minimum depth of about 10 nm and a maximum depth of 30 nm as taught by Yu '385 to improve threshold voltage (col. 1, lines 50-56).

Saha discloses the claimed invention except for the amorphous pocket region having a thickness between 10 and 20 nm; and the amorphous shallow implant region having a thickness between 5 and 10 nm. It would have been obvious to one having

ordinary skill in the art at the time invention was made to have the amorphous pocket region with a thickness between 10 and 20 nm; and the amorphous shallow implant region with a thickness between 5 and 10 nm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (CCPA 1955).

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Saha in view of Lee, Yu '385 and Krishnan et al. as applied to claim 17 above, and further in view of Yu '325.

Saha in view of Lee, Yu '385 and Krishnan et al. disclose the subject matter claimed above including the pocket amorphizing implantation comprises implanting Sb or In species (Saha: col. 4, lines 36-59) and the amorphous pocket region is formed at a depth between 40 and 100 nm (Yu '385: col. 2,lines 58-63). However, Saha in view of Lee, Yu '385 and Krishnan et al. do not disclose the pocket amorphizing energy between 115 and 150 keV using a quad implant at a 45-degree angle.

Yu '325 discloses a method for forming an amorphous shallow implant region including providing a gate structure (18), on a substrate (14) (Fig. 2; col. 6, lines 4-6); performing a pocket amorphizing implantation procedure to implant ions of a second conductivity type to form a pocket implant region (70/72) adjacent to the gate structure (18); the amorphous pocket region (70/72) is formed at a first depth below the substrate surface (21) (Fig. 4; col. 6, lines 23-39); performing a SDE implant to form SDE regions (78/80) of a second conductivity type using the gate structure (36) as a mask (Fig. 5;

col. 6, lines 40-47); performing a source/drain implant procedure to form deep source/drain regions (22/24) (Fig. 6; col. 6, lines 48-60).

Referring to claims 4 and 11, Yu '325 discloses using a quad implant at 45-degree angle to form the pocket amorphizing implantation (col. 6, lines 23-32).

Since Saha and Yu '325 are both from the same field of endeavor, a method for forming a pocket implantation regions, the purpose disclosed by Yu '325 would have been recognized in the pertinent art of Saha. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Saha by using a quad implant at 45 degree angle to form the pocket amorphizing implantation as taught by Yu '325 to optimize the channel profile (col. 2, lines 38-40).

Referring to claims 4 and 11, Saha discloses the pocket amorphizing implantation claim 1 wherein the pocket amorphizing energy may be between 100 and 1000 eV (col. 5, lines 2-6). It is noted that the specification contains no disclosure of either the critical nature of the claimed concentrations or any unexpected results arising there from. It would have been obvious to one of ordinary skill in the art to form the amorphous pocket region with an energy between 115 and 150 KeV since it has been held that "In such an situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) See MPEP § 2144.05.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ilderem et al. (5,675,166) and Park et al. (6,268,640) both disclose first and second halo regions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E. Perkins whose telephone number is (571) 272-1840. The examiner can normally be reached on Monday thru Friday, 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Trinh
Primary Examiner
Art SPE

PEP